

NOTES ON LAND-SHELLS FROM A HOLOCENE DEPOSIT AT THE
HORSESHOE PIT, COLLEY HILL, REIGATE.

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Read 9th June, 1899.

THE object of this paper is to describe the land-shells from a deposit at Reigate which I worked in June and July, 1898. My aim was to work out as far as possible the date of *Helix pomatia*, to which Lieut.-Col. H. H. Godwin-Austen, F.R.S., our President, called attention on June 10th, 1898.

He had about twenty years before found some bones¹ associated with *H. pomatia* at a depth of about two feet. Dr. Henry Woodward, F.R.S., has identified amongst these bones the hyoid bone of *Equus* and the metatarsal either of *Ovis* (sp.) or *Capreolus caprea*. They are much eroded by roots of plants. In the metatarsal bone occurred a very brittle *Vallonia pulchella*. These bones, which adhere strongly to the tongue, are from the upper part of the quarry in the Upper Greensand to the east of the Horseshoe Pit, the superficial layer in which corresponds to that in the latter, though it is not so thick. The material in which the shells occur is a mixture of Middle Chalk and Upper Greensand. From the former derived examples occurred of *Terebratulina gracilis*, var. *lata*; *Terebratulina triangularis*, Ether.; *Rhynchonella Martini*, Mant.; *Kingena lima*, Defrance; *Rhynchonella Grasiana*?, D'Orb.; Belemnite fragment, and species of *Echini*; whilst probably from the Upper Greensand, there was a faceted hydrated manganous oxide (Mn O) nodule.

There are reasons for believing that the popular name of 'Roman' Snail for *Helix pomatia* is a misnomer. The species is found in southern Scandinavia,² to which the Romans did not penetrate. Mrs. McKenny Hughes points out that though *Helix aspersa* is found in great abundance in Roman rubbish pits at Chesterford³ and other places round Cambridge, and though it still occurs in a living state at Shelford, shells of *Helix pomatia* do not occur in such Roman remains. Kew⁴ (quoting Jeffreys) affirms that it does not occur in Roman remains among other shells in Northants, although abundant at Woodford in the same county, and (quoting Rev. L. Blomefield) says that the

¹ Now in my possession.

² Jordan, "Die Binnenmollusken, etc.": Nova Acta Acad. Cæs. Leop.-Carol., Bd. xlv, No. 4, table 10.

³ Geol. Mag., 1888, pp. 205, etc.

⁴ Dispersal of Shells, pp. 240, 241.

latter at Bath neither found nor heard of the discovery of a single specimen either living or dead, although the Romans occupied the spot more than 400 years. It seems strange that the Romans could have introduced a snail which in England they never used. Again, Jeffreys¹ says: "in all probability this kind of snail was not known to them, as another species (*H. lucorum*) takes its place in Central Italy."

At the Horseshoe deposit *H. pomatia* occurred at depths of 1 ft. 9 ins., 2 ft., 2 ft. 3 ins., 2 ft. 6 ins., and 2 ft. 9 ins. (fragments), and a young individual at 3 ft. 6 ins.

I found an early form of Neolithic scraper, with bulb and éraillure, at a depth of 2 ft. 6 ins., so that probably *Helix pomatia*, as well as *Helix aspersa*, is of Neolithic age.

Clausilia Rolphi (Gray) occurred at a depth of nearly three feet. It has been recorded only from Kent, Sussex, Hants, and Gloucestershire, according to Mr. J. C. Mansel-Pleydell, F.L.S., F.G.S., and, he adds, Dorset,² but Mr. Lionel Adams³ records all the British *Clausiliæ* for Surrey. I have not found *C. Rolphi* living at Reigate. It occurs in the Pleistocene deposits of Copford⁴ and Clacton,⁴ and North-east London,⁵ but it is not recorded from Barnwell, Grantchester, or Barrington. It occurs in Kent as high as 450 feet above O.D.

Pomatias reflexus occurred abundantly throughout the section.

The internal granules of *Arion ater* were so numerous between the two and three foot levels that I ceased to collect them. The abundance of this moisture-loving mollusc, as also of *Helicigona arbustorum* and *Carychium minimum*, points to a far damper condition of the locality than at present obtains. *Helicigona arbustorum* is now extinct in the neighbourhood of the Horseshoe Pit, although fine specimens were procurable a few years ago from an osier-bed near Redhill Station.

Helicella Cantiana so far occurs only in the upper two feet of the deposit.

An abnormally large thick internal shell of *Limax maximus* is worth noting. This was from near the 2 ft. 6 in. horizon. It measures $\frac{3}{8}$ " \times $\frac{3}{16}$ " \times $\frac{1}{8}$ ".

Cæcilianella acicula was extremely abundant throughout.

Bulinus montanus occurred (two specimens) at the 2 ft. and $2\frac{1}{2}$ ft. levels respectively. It occurs in the Pleistocene of Barnwell,⁶ Grantchester,⁶ and Clacton,⁷ and is still living in the Thames Valley, but has not hitherto been recorded for this part of England. Like *Helicigona arbustorum*, *Helicodonta obvoluta*, and *Clausilia Rolphi*, it is very restricted in its range, and seems slowly dying out.

¹ Brit. Conch., vol. i, p. 178.

² Mollusca of Dorset, p. 17.

³ British Land and Fresh-water Shells, 2nd ed., p. 192.

⁴ Kennard & Woodward: Essex Naturalist, vol. x, p. 108.

⁵ B. B. Woodward: Proc. Geol. Assoc., vol. xi, p. 55.

⁶ Mrs. Hughes, op. cit.

⁷ Kennard & Woodward, op. cit.

LIST OF LAND MOLLUSCA
FROM THE HOLOCENE DEPOSIT AT REIGATE, WITH THE
RELATIVE DEPTHS AT WHICH THEY OCCUR.

NAME OF SPECIES.	Depth of occurrence as far as						
	6 inches.	1 foot.	18 inches.	2 feet.	2 ft. 6 ins.	3 feet.	4 feet.
<i>Limax maximus</i> , Linn.					X		
* <i>Agriolimax agrestis</i> (Linn.)		X		X	X	X	
<i>Vitrea cellaria</i> (Müll.)		X			X		
— <i>nitidula</i> (Drap.)	X		X	X	X	X	
— <i>pura</i> (Ald.)				X			
— <i>crystallina</i> (Müll.)				X	X	X	
* <i>Arion ater</i> (Linn.)		X		X		X	
— sp.					X		
* <i>Pyramidula rotundata</i> (Müll.)		X	X	X	X	X	X
<i>Helicella Cantiana</i> (Mont.)	X	X	X	X			
— <i>Itala</i> (Linn.)	X	X	X	X	X	X	
— <i>caperata</i> (Mont.)		X	X	X	X		
* <i>Hygromia rufescens</i> (Penn.)	X	X	X	X	X	X	X
*— <i>hispida</i> (Linn.)	X	X	X	X	X	X	
<i>Acanthinula aculeata</i> (Müll.)					X		
* <i>Vallonia pulchella</i> (Müll.)	X	X	X	X	X	X	
<i>Helicigona arbustorum</i> (Linn.)					X		X
— <i>lapicida</i> (Linn.)			X				
<i>Helix aspersa</i> , Müll.		X					
— <i>pomatia</i> , Linn.				X	X		X
— <i>nemoralis</i> , Linn.			X	X	X	X	
— <i>hortensis</i> , Müll.						X	X
<i>Buliminus montanus</i> (Drap.)				X	X		
— <i>obseurus</i> (Müll.)			X				
<i>Cochlicopa lubrica</i> (Müll.)	X	X	X	X	X	X	
<i>Azeca tridens</i> (Pult.)			X			X	
<i>Cæcilianella acicula</i> (Müll.)	X	X	X	X	X	X	X
<i>Pupa muscorum</i> (Linn.)		X	X	X	X	X	
<i>Vertigo pygmaea</i> (Drap.)					X	X	
<i>Clausilia laminata</i> (Mont.)				X	X		
— <i>bidentata</i> (Ström.)				X	X	X	
— <i>biplicata</i> (Mont.)					X		
— <i>Rolphii</i> , Gray						X	
<i>Carychium minimum</i> , Müll.						X	
* <i>Pomatias reflexus</i> (Linn.)	X	X	X	X	X	X	
Total, 35 species.							

* Abundant.

Fragments of a banded *Helix* (probably *H. nemoralis*) were plentiful throughout, with portions of the opercula of *Pomatias reflexus*. Fragments of *Helix pomatia* were fairly abundant in the upper 2½ feet.

Helix aspersa (two specimens) occurred at 9 ins. and 10½ ins. depth respectively. I cannot understand its absence from the lower levels, as it is painfully abundant in Reigate gardens, and I have found it hibernating in some numbers in the Walton Lane, about the same level as the Horseshoe Pit.

My sincere thanks are due to Mr. B. B. Woodward, for much help in identifying critical specimens, to Dr. Henry Woodward, for identifying the bones mentioned, to Lieut.-Col. H. H. Godwin-Austen, for kindly giving me the *H. pomatia* and bones from Reigate, also to Mr. H. Woods, of Cambridge, and Dr. F. L. Kitchin, for identifying the derived fossils.